

# OWNERS MANUAL



***DPM<sup>®</sup> SX***



WARNING: TO PREVENT ELECTRICAL SHOCK OR FIRE HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE. BEFORE USING THIS APPLIANCE, READ THE OPERATING GUIDE FOR FURTHER WARNINGS.

# DPM® SX MANUAL UPDATE — REVISION TO UPDATE

## CHAPTER 3

### Chapter 3 — Using the SX as a Stand-Alone Sampler

The DPM SX can be used as a high-performance “front-end” sampler for any PCM sample player, sample editor, or sample storage unit that supports the MIDI Sample Dump Standard or is capable of transmitting and receiving MIDI System Exclusive messages. It has been designed with a full complement of controls, available from the front panel, that allows operation in a wide variety of applications. This chapter presents the use of the DPM SX as a “stand-alone front-end sampler” that can be used in the most general applications.

To use the DPM SX as a stand-alone sampler:

- Connect your “sound” source into one of the two input jacks on the front panel of the DPM SX. If you are using a microphone, connect it to the XLR jack. If you are using a CD player, mixer output, or other line level signal, connect it to the 1/4” phone jack.
- Select the desired sample rate (depending on the desired sound fidelity or frequency response) by depressing the “SAMPLE RATE” button on the front panel. Using this button, the sample rate can be set to either 24 kHz or 48 kHz, providing bandwidths of either 10 kHz or 20 kHz, respectively.
- While playing the instrument or sound that is to be sampled, adjust the input level control until the clip/threshold LED flashes “red” only for an instant on the peaks of the signal. As you become more familiar with the DPM SX, you will determine what the optimal signal level is for your own specific needs.
- If the sampling is to be initiated by the input signal, depress the “ARM” button. The LED indicator above the “ARM” button will begin to flash, indicating that the sampler is “armed” and waiting on the input signal to trigger the sampling process. The default trigger level is 30 dB down from the clip level.
- If the sample is to be manually initiated from the front panel, it is not necessary to “arm” the sampler. It is only necessary to depress the “START/STOP” button at the beginning of the sample and depress it a second time at the end of the sample. If the sample memory is filled before the “START/STOP” button is depressed the second time, the sampling process will automatically stop.

**Note:** The sample length (in seconds) will be determined by the sample rate that has been selected and the total amount of memory that has been loaded into the unit. For example: At a sample rate of 48 kHz with 1 Megabyte of memory, the total sample time will be approximately 11 seconds.

At this point, the sample resides in the DPM SX sample memory. It can now be transferred to the sample player, sample storage unit, or sample editor for editing and playing.

- To transfer the sample from the DPM SX to the sample editor/player, simply set up the sample editor/player to receive the sample via the MIDI sample dump standard, and depress the “MIDI DUMP” button on the front panel of the DPM SX.

**Note:** The Sample can also be requested from the DPM SX by requesting any sample number using a MIDI Sample Dump request command.

# DPM® SX OWNER'S MANUAL

## CONTENTS

### Chapter 1 — Introduction

Congratulations on your purchase of the DPM® SX Sampling Interface. Peavey engineers have taken the 16-bit Delta-Sigma Sampling capability that has been demonstrated in the new Peavey keyboard products and introduced it in a package with a very user friendly environment, providing an affordable Sampling “front end” for even the most critical Sampling enthusiast.

The DPM SX will give you many years of enjoyment, not just because of the features that it offers today, but because it is designed to operate with many Sample Editing or Sampler platforms that might be available in the near future.

Although the operation has been optimized for the current and future Software versions of the Peavey DPM 3SE, it can be used in any Sampling System that supports the MIDI Sample Dump Standard or can support the flexible MIDI System Exclusive controls that the DPM SX understands.

The DPM SX can be used to further expand your performance system by allowing you to create your own personalized “pallet” of sound samples for use with your favorite Sampling System.

Highlights of the current configuration include:

- 16-bit Delta-Sigma A/D conversion
- Selectable Sample rates to 48 kHz
- Expandable internal memory (up to 16 Megabytes)
- Standard Computer SIMM compatibility
- Full MIDI Sample Dump Standard compatibility
- Optional SCSI Interface for high speed data transfer
- Extensive MIDI System Exclusive control capability
- Line Level/Microphone Level (w/phantom power) inputs
- Optimized for operation with the DPM 3SE

Before doing anything else, send in your warranty registration. This will allow Peavey to advise you of any future updates or enhancements to this units' and compatible units' operation.

## 1.1 About this Manual

This manual is divided into five main chapters:

- **Introduction.** This section shows you how to make some great sounds right out of the box.
- **Using the DPM SX with the DPM 3SE.** The new versions of software for the DPM 3SE Sample-based synthesizer are optimized for operation with the DPM SX and offer many additional features when connected via MIDI. This section describes the operation with the DPM 3SE and how you can get the most out of the combination of these two products.
- **Using the DPM SX with a Computer-Based Sample Editor.** For those who want to use their existing computer or Sample Editing software packages, the DPM SX has been designed to work with MIDI Standard Control commands. This section covers the operation of the DPM SX in that environment.
- **Using the DPM SX as a Stand-Alone Sampler.** In the simplest of applications, the DPM SX can capture samples that can ultimately be passed to any other instrument or computer that supports the MIDI Sample Dump Standard. A reduced set of control functions and features are available through use of the front panel controls. This section describes this stand-alone capability.
- **About Sampling.** This section provides background material on the sampling process for those who are new to sampling.
- **MIDI Supplement.** It is important to know the basics of the MIDI specification to make the best use of the DPM SX's MIDI features. If you are not very familiar with MIDI, please read the MIDI Supplement before proceeding.

## 1.2 Tutorial and Setup

On the air in 15 minutes with the SX.

### A. Cable Setup

1. Unpack the DPM SX. Save all packing materials in case the unit needs to be sent for updating or servicing.
2. Plug the female end of the wall-mount power supply into the matching socket on the rear of the DPM SX.
3. With all devices in your system turned "off" and the volume controls turned down, hook up the MIDI connections according to your needs, as describe in the rest of this manual.

**NOTE:** For the most general MIDI set up, it will be necessary to connect cables to both the MIDI In and MIDI Out jacks located on the rear panel. This will allow communication to the DPM SX and from the DPM SX back to the rest of

the MIDI System. If **only** the MIDI Out connection is made, all MIDI Sample Dumps must be initiated from the DPM SX front panel “MIDI Dump” button.

## B. Powering Up

Turn on your equipment in the following order (this is good practice for any MIDI/Audio set up, not just the DPM SX):

- DPM SX
- Computer or sequencer (if present)
- Synthesizers, sound generators, and signal processors
- Mixer (with Master Outputs turned all the way down)
- Power amplification system

Turn up the Mixer master output controls to a low level as you test out the system. Turn up to normal volume once you're satisfied that the system is working properly.

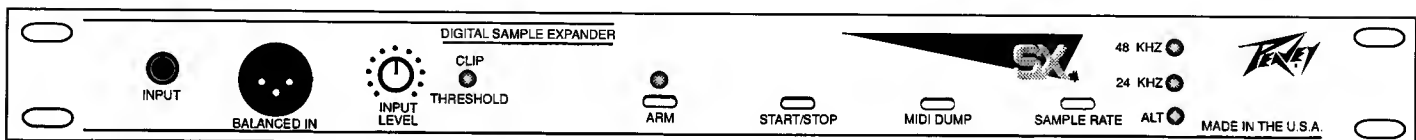
### 1.3 Getting Around the DPM SX

#### The Front Panel

Now that the MIDI connections are made, it's time to match the DPM SX to your particular needs. Most of this customization requires no particular reconfiguration, only different steps in operating the unit.

There are two main operating modes:

- Front Panel Operation (Input Level, Arm, Start/Stop, MIDI Dump, Sample Rate). These controls offer a subset of the features of the DPM SX, and are used to “locally” set up the DPM SX to capture a Sample from the desired source (microphone, CD, mixer).
- MIDI Controlled Remote Operation (DPM 3SE, System Exclusive). These System Exclusive commands offer an extended feature set, and are used to “remotely” set up the DPM SX to capture a Sample. These System Exclusive commands also provide a wider variety of operational modes that better support a full MIDI Sampling System. They are available when the DPM SX is connected to a computer or to the DPM 3SE operating system. They are described in more detail in Chapter XX.



**The Input Connections.** For your convenience, two different types of audio signal input connectors are provided. These include:

- Line Level Input (1/4" phone jack). This connector should be used for any audio signal coming from a Line Level output on the sound source (CD, mixer, keyboard, sound generator).
- Microphone Input ("phantom powered" XLR Connector). This connector should be used for any condenser or dynamic microphone signal input. It should be used when the sample is to be made from "live" music, vocals, or special percussive effects.

**Input Level Adjustment.** This control is provided to assure that you are getting the best possible signal-to-noise performance in your samples. The input level should be adjusted in the following way, regardless of which input connector is being used:

- Connect the audio source to the appropriate input jack on the front panel.
- Turn the input level control to its minimum setting (full counter-clockwise).
- While playing the "sound" to be sampled into the DPM SX, gradually turn up the input level (clockwise). The "Clip/Threshold" indicator to the right of the Input Level control should first begin to flash "green" to indicate that a signal is present and that the level is sufficient to "trigger" the Sampler (threshold).
- Continue to turn up the Input Level until the "Clip/Threshold" indicator begins to flash "red" on the peaks of the program input. Then, turn the Input Level down until the SE "red" indications do not occur, as they do actually indicate a "clipped" sample.

**Caution:** Sampling with this "Clip/Threshold" indicator displaying a continuous "red" color will result in a clipped (distorted) sample. Experimenting with various levels will be necessary until you have a good feel for the appropriate setting. This setting will probably vary as the source of the "sound" is changed. Please refer to the "About Sampling" section later in this manual for help in capturing better samples.

**About the Control Buttons.** There are four control buttons on the front panel of the DPM SX (ARM, START/STOP, MIDI DUMP, SAMPLE RATE). These buttons are used to operate the DPM SX "locally," when it is being used without a DPM 3SE or other "remote" controller system. The functions associated with these buttons are described below:

- **Arm.** The Arm button is used to place the DPM SX in a "stand-by" mode, waiting for any one of the several "trigger" signals to initiate the sampling process. When the ARM button is depressed, the indicator directly above the button will begin to flash, indicating that the sampler is "armed" and ready to sample. Once the sampler is "armed," there are five ways to "trigger" the sampling process. These are described later in the manual, as they relate to the

operation of the DPM SX.

- **Start/Stop.** This button is used to “manually” start and stop the sampling process. When the button is depressed the first time, the sampling starts. When it is depressed again, the sampling stops. Any audio signal that is presented to either of the inputs during that time will be sampled, regardless of the signal level. It should be noted that if the amount of sample memory in the DPM SX is exceeded during the sampling, the sampling process will be automatically stopped.
- **MIDI Dump.** The MIDI Dump button provides a way to initiate the SDS Bulk Sample Dump from the DPM SX to the sample player of choice (DPM 3SE, DPM SP, etc.). When this button is depressed, any sample that is currently in memory will be automatically dumped via MIDI to the sample player.
- **Sample Rate.** This button provides a way to select the internal sample rate of the DPM SX from the front panel. With this button, a sample rate of either 48 kHz or 24 kHz can be selected. Selecting 24 kHz, as opposed to 48 kHz, will effectively double the total sample “time” for samples that do not require the full 20 kHz bandwidth offered by the 48 kHz sample rate. The selected sample rate is displayed via the LED indicators immediately to the right of the Sample Rate button. The LED labeled “Alt” can only be accessed via System Exclusive commands from a DPM 3SE or some other MIDI controller/computer.

**Five Ways to “Trigger” the DPM SX Sampler.** After the DPM SX is “armed” and the LED above the ARM button is flashing, there are five ways to actually start or “trigger” the sampling process. The first two of these methods are available when the DPM SX is used in any MIDI sampling system. The last three are only available when the DPM SX is used with a DPM 3SE or some other computer system that is capable of transmitting MIDI System Exclusive commands to the DPM SX, enabling one of these three methods. The System Exclusive commands that are used to set up these “trigger” modes are listed in Chapter XX of this manual. The five “trigger” methods include:

1. **Threshold.** When an audio signal is present at either of the two inputs with a level that is greater than the current threshold value (the default is 30 dB down from the previously described “clip” level), the sampling process will start. It should be noted that the input signal level be set as described above prior to “arming” the sampler. This will save you much time, especially when making long samples.
2. **Start/Stop Button.** The sampling process can be initiated at any time by depressing the “START/STOP” button on the front panel of the unit.
3. **Note On.** The DPM SX can be set up to “trigger” the sampling upon the reception of a MIDI “Note On” command. Since this command is transmitted



each time a MIDI instrument is played, it becomes a convenient way of triggering the sampling of sounds that are to be played from another MIDI instrument. The DPM SX must be configured in this “trigger” mode through the reception of a System Exclusive message from a computer or from a DPM 3SE.

4. **Continuous Controller.** There are times when you will want to use an independent “remote trigger” device for your sampler. For this reason, the DPM SX has been designed with the capability to respond to MIDI Continuous Controller data upon the reception of a MIDI Continuous Controller message, the sampling will be started. The DPM SX can only be set up on this “trigger” mode through the reception of a System Exclusive message from a computer or from a DPM 3SE.
5. **DPM 3SE “-GO-” Button.** For those of you who are lucky enough to have a Peavey DPM 3SE Composition Center, the sampling can be initiated by depressing the “-GO-” soft button from the DPM SX Set-Up menu described later in this manual. A System Exclusive “Start” command can also be transmitted from any other MIDI computer system to “trigger” the sampler.

## 1.4 Quick Parameter Set-Up

Now that all the connections are made and you know how the front panel controls work, it's time to adjust the parameters necessary to sample your favorite “sound” and pass it on to your sample editor/player. A more detailed discussion about how to use the DPM SX in your particular MIDI System is described in later chapters. However, to try out your DPM SX and see how it works, try the following short cut:

- Connect your “sound” source into one of the two input jacks on the front panel of the DPM SX. If you are using a microphone, connect it to the XLR jack. If you are using a CD player, mixer output, or other line level signal, connect it to the 1/4” phone jack.
- Select the desired sample rate (depending on the desired sound fidelity or frequency response) by depressing the “SAMPLE RATE” button on the front panel. Using this button, the sample rate can be set to either 24 kHz or 48 kHz, providing bandwidths of either 10 kHz or 20 kHz, respectively.
- While playing the instrument or sound that is to be sampled, adjust the Input Level control until the clip/threshold LED flashes “red” only for an instant on the peaks of the signal, then turn it down just a little to ensure a good signal-to-noise ratio. As you become more familiar with the DPM SX, you will determine what the optimal signal level is for your own specific needs.
- If the sampling is to be initiated by the input signal, depress the “ARM” button. The LED indicator above the “ARM” button will begin to flash, indicating that the sampler is “armed” and waiting on the input signal to trigger the sampling process. The default trigger level is 30 dB down from the “clip” level.

- If the sample is to be “manually” initiated from the front panel, it is not necessary to “arm” the sampler. It is only necessary to depress the “START/STOP” button at the beginning of the sample and depress it a second time at the end of the sample. If the sample memory is filled before the “START/STOP” button is depressed the second time, the sampling process will automatically stop.

**Note:** The sample length (in seconds) will be determined by the sample rate that has been selected and the total amount of memory that has been loaded into the unit. For example: At a sample rate of 48 kHz with 1 Megabyte of memory, the total sample time will be approximately 11 seconds.

At this point, the sample resides in the DPM SX sample memory. It can now be transferred to the sample player (DPM 3SE or DPM SP) for editing and playing, or to a computer-based sample editor for editing.

- To transfer the sample from the DPM SX to the sample editor/player, simply set up the Sample Editor/Player to receive the sample via the MIDI Sample Dump Standard and depress the “MIDI DUMP” button on the front panel of the DPM SX.

**Note:** The sample can also be requested from the DPM SX by requesting any sample number using a MIDI sample dump request command.

## Chapter 2 — Using the SX with the DPM 3SE

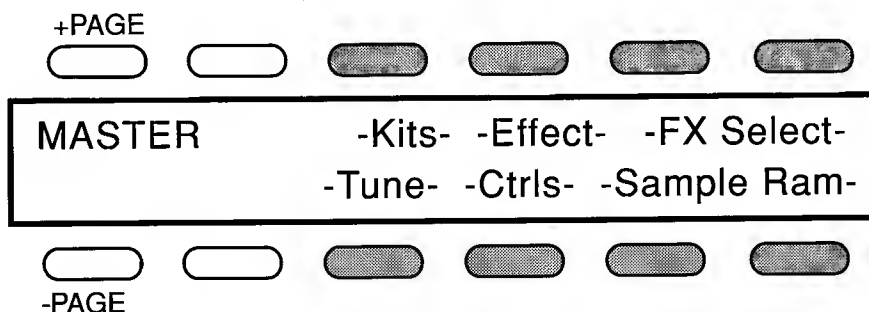
The DPM SX is designed for optimal use when set up with the DPM 3SE Composition Center running software Version 2.0 or later. When the DPM SX is connected to the DPM 3SE, several operating system displays will be available on the DPM 3SE that are not available otherwise. These displays are available under the master sample RAM edit menus.

To get the most from your new DPM SX, connect it up to the DPM 3SE in the following manner:

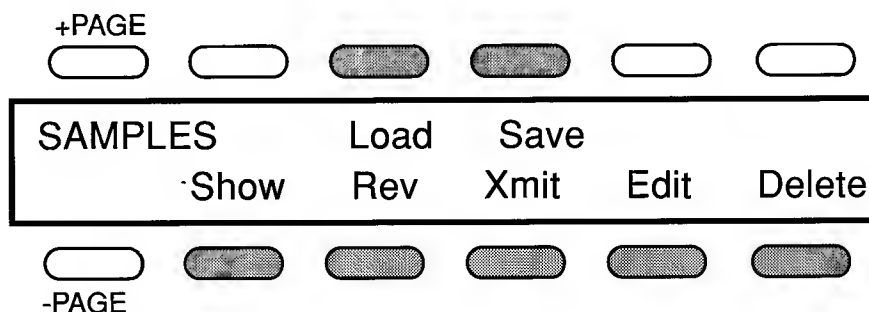
- Connect both MIDI cables to the units, allowing for commands and data to be sent in both directions.

If you have a complex MIDI system setup, you might want to use a MIDI data processor/patcher such as the Peavey MIDI Master™ to allow for the most flexible MIDI cabling. The Peavey MIDI Master will allow a number of MIDI instruments and controllers to be interconnected in different configurations without having to reconnect the cables each time a new MIDI configuration is needed.

- Connect the rest of your MIDI or keyboard system in the way that best suits your needs.
- Turn on each unit in your system in the previously described order. Make sure that your DPM 3SE is running software Version 2.0 or later.
- Connect your music or instrument "sound" source to the front panel of the DPM SX. Use the 1/4" phone jack for line level input signals, or the XLR jack for any microphone level input signal (phantom powered or otherwise).
- Depress the MASTER button on the System section of the front panel of the DPM 3SE, displaying the following Master Control menu:

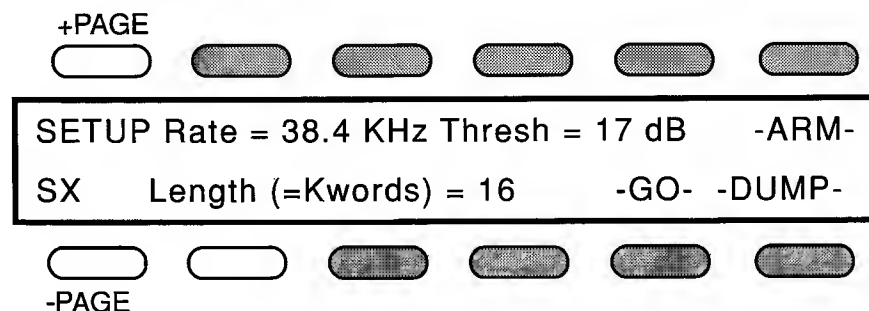


- From this display, the "-SAMPLE RAM-" soft button should be depressed, selecting the functions that are available for loading, saving, and editing your custom samples for the DPM 3SE. This display is shown below.



**Note:** For a description of each of the seven functions provided on this display, please refer to Chapter XX of the DPM 3SE Owner's Manual.

- Depress the "RCV" soft button to reveal the DPM SX Setup menu shown below. If this display does not appear, please check your MIDI connections and cabling.



From this display, the DPM SX can be set up to “record” your favorite samples or sounds. As you can see from this menu, far more flexibility is available from the DPM 3SE control than is available from the front panel of the DPM SX. Since this allows for complete “remote” control of the DPM SX, it is not necessary to continually revisit your “rack gear” to reconfigure sampler parameters.

- Select the desired sample rate by depressing the “RATE” soft button and adjusting the parameter by using any of the data edit devices (slider, wheel, or buttons). The Sample Rate can be set to 16.0 kHz, 24.0 kHz, 32.0 kHz, 38.4 kHz (DPM 3SE sample rate), or 48 kHz.

**Note:** When the sample rate is changed, the frequency response of the sample will be automatically adjusted to the optimal setting. The upper frequency limit will be set to a value that is slightly less than half the sample rate (frequency).

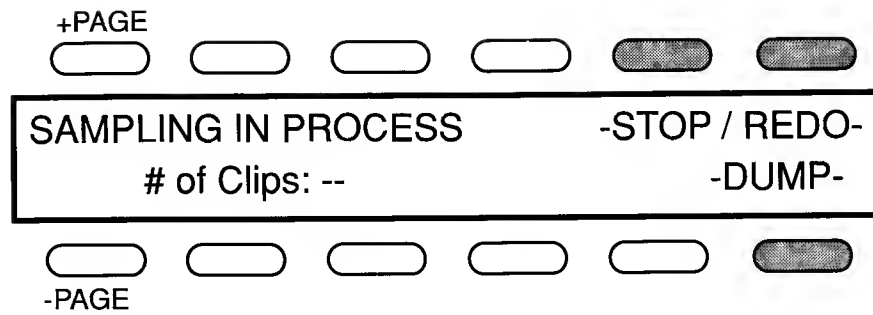
- Adjust the “trigger” threshold by depressing the “THRESH” soft button and changing the parameter with any of the data edit devices. The threshold can be adjusted to any value from 42 dB to 00 dB below the “clip” level of the sampler. The default “trigger” threshold is 30 dB below the “clip” level.

If it is desirable to “trigger” or initiate the sampling process using either a “Note On” MIDI command or any “MIDI Continuous Controller” command, the “THRESH” parameter can be set to either “NOTE” or “CTRL”. This is handy when sampling a sound from another keyboard or synthesizer.

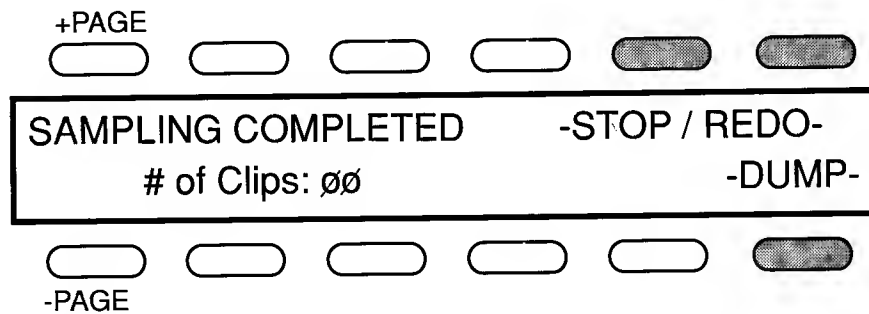
- Set the maximum sample length by depressing the “Length (Kwords)” soft button and selecting the appropriate number. The maximum sample length can be set to any size from 00 Kwords to the total memory that is installed in the DPM SX. This value can be set in 1K word increments.
- While playing the instrument or sound that is to be sampled, adjust the input level control until the clip/threshold LED no longer flashes “red” on the peaks of the signal. As you become more familiar with the DPM SX, you will determine what the optimal signal level is for your own specific needs.

Now that all of the parameters are set up, it is time to record your sample. For “manual” sampling, simply depress the “-GO-” soft button. For “automatic” sampling, depress the “-ARM-” soft button and then initiate the sampling process using the predetermined “trigger” method. It should be noted that if the sampling is initiated using the “-GO-” soft button, there might be some slight delay in the actual start due to the delay encountered when the MIDI System Exclusive command is transmitted. This is usually not a problem, since the DPM SX always provides a 512 word “pre-sample buffer.”

- If either the “-GO-” or the “-ARM-” soft button are depressed, the following display will appear, indicating that the sampling process has been initiated.



- When the sampling is complete, the following display will appear:



From this display, you can determine whether the sound sample suffered from any “clipping.” The total number of times that the signal clipped is represented by the “# OF CLIPS: 00” display. This number should correspond to the number of times that the “clip” indicator flashed on the DPM SX. If you want to try again, simply depress the “STOP/REDO” soft button and the DPM 3SE will return to the DPM SX Setup menu.

At this point, the sample resides in the DPM SX sample memory. It can now be transferred to the DPM 3SE for editing and playing.

From any of the three menus, a “dump” of the most recent sample can be requested by depressing the “-DUMP-” soft button on the DPM 3SE. When this button is pushed, the MIDI SDS Receive menu will be presented. For more information on how to operate the DPM 3SE and perform further sample editing, please refer to Chapter 7 of the DPM 3SE Owner’s Manual.

## Chapter 3 — Using the SX as a Stand-Alone Sampler

The DPM SX can be used as a high-performance “front-end” sampler for any PCM sample player, sample editor, or sample storage unit that supports the MIDI Sample Dump Standard or is capable of transmitting and receiving MIDI System Exclusive messages. It has been designed with a full complement of controls, available from the front panel, that allows operation in a wide variety of applications. This chapter presents the use of the DPM SX as a “stand-alone front-end sampler” that can be used in the most general applications.

## Chapter 4 — Using the SX with a Computer-Based Sample Editor

Each of the parameters available to the DPM 3SE, and as described in the previous section are available via standard MIDI System Exclusive commands. However, some sample editing software packages are not set up to easily accommodate the transmission of these System Exclusive commands. For this reason, the DPM SX has been designed to operate just as easily (but with somewhat reduced capabilities) from its own front panel. The following two sections describe how to use the DPM SX in both types of systems.

### 4.1 Operation with Sample Editors using System Exclusive

If your Sample Editor supports the transmission of System Exclusive commands that can be used to set up or configure the DPM SX, the following procedure should be used to get the most out of your sampling.

- Connect both MIDI cables to the DPM SX and to your computer, allowing MIDI information to be sent in both directions.

If you have a complex MIDI System setup, you might want to use a MIDI Data processor/patcher such as the Peavey MIDI Master to allow for the most flexible MIDI cabling. The Peavey MIDI Master will allow a number of MIDI instruments and controllers to be interconnected in different configurations without having to reconnect the cables each time a new MIDI configuration is needed.

- Connect the rest of your MIDI or keyboard system in the way that best suits your needs.
- Turn on each unit in your system in the previously described order.
- Connect your music or instrument “sound” source to the front panel of the DPM SX. Use the 1/4” phone jack for line level input signals or the XLR jack for any microphone level input signal (phantom powered or otherwise).
- Load and start up your favorite sample editing software package.
- Program into this software the necessary System Exclusive commands to control the DPM SX. These commands can be found in the MIDI Supplement of this manual.

To get an idea of which commands might be desirable or necessary, it might be beneficial to refer to the previous chapter on using the DPM SX with the Peavey DPM 3SE. These commands can be programmed to automatically set up the DPM SX, or they can be sent out manually as needed. The best method of using this capability will depend on your needs, and on the capabilities of your favorite software packages.

These commands can be sent individually, or as a single continuous block by using the “Set All Parameters” message. Using these commands, make sure that you:

- Set the desired sample rate as either 16.0 kHz, 24.0 kHz, 32.0 kHz, 38.4 kHz (DPM 3SE sample rate), 44.1 kHz or, 48 kHz.

To use the DPM SX as a stand-alone sampler:

- Connect your “sound” source into one of the two input jacks on the front panel of the DPM SX. If you are using a microphone, connect it to the XLR jack. If you are using a CD player, mixer output, or other line level signal, connect it to the 1/4” phone jack.
- Select the desired sample rate (depending on the desired sound fidelity or frequency response) by depressing the “SAMPLE RATE” button on the front panel. Using this button, the sample rate can be set to either 24 kHz or 48 kHz, providing bandwidths of either 10 kHz or 20 kHz, respectively.
- While playing the instrument or sound that is to be sampled, adjust the input level control until the clip/threshold LED flashes “red” only for an instant on the peaks of the signal. As you become more familiar with the DPM SX, you will determine what the optimal signal level is for your own specific needs.
- If the sampling is to be initiated by the input signal, depress the “ARM” button. The LED indicator above the “ARM” button will begin to flash, indicating that the sampler is “armed” and waiting on the input signal to trigger the sampling process. The default trigger level is 30 dB down from the clip level.
- If the sample is to be manually initiated from the front panel, it is not necessary to “arm” the sampler. It is only necessary to depress the “START/STOP” button at the beginning of the sample and depress it a second time at the end of the sample. If the sample memory is filled before the “START/STOP” button is depressed the second time, the sampling process will automatically stop.

**Note:** The sample length (in seconds) will be determined by the sample rate that has been selected and the total amount of memory that has been loaded into the unit. For example: At a sample rate of 48 kHz with 1 Megabyte of memory, the total sample time will be approximately 11 seconds.

At this point, the sample resides in the DPM SX sample memory. It can now be transferred to the sample player, sample storage unit, or sample editor for editing and playing.

- To transfer the sample from the DPM SX to the sample editor/player, simply set up the sample editor/player to receive the sample via the MIDI sample dump standard, and depress the “MIDI DUMP” button on the front panel of the DPM SX.

**Note:** The Sample can also be requested from the DPM SX by requesting any sample number using a MIDI Sample Dump request command. The sample will be sent using the number requested.

**Note:** When the sample rate is changed, the frequency response of the sample will be automatically adjusted to the optimal setting. The upper frequency limit will be set to a value that is slightly less than half sample rate (frequency).

- Adjust the “trigger” threshold. The Threshold can be adjusted to any value from 42 dB to 00 dB below the clip level of the sampler. The default “trigger” threshold is 30 dB below the clip level.

If it is desirable to “trigger”, or initiate, the sampling process using either a “Note On” MIDI command or any “MIDI Continuous Controller” command, this can also be accomplished via a separate MIDI System Exclusive command (see the MIDI Supplement). This is helpful when sampling a sound from another keyboard or synthesizer.

- Set the maximum sample length. The maximum sample length can be set to any size from “1 word” to the total memory that is installed in the DPM SX. This value can be set in 1 word increments.
- While playing the instrument or sound that is to be sampled, adjust the input level control until the clip/threshold LED no longer flashes “red” on the peaks of the signal. As you become more familiar with the DPM SX, you will determine what the optimal signal level is for your own specific needs.

Now that all of the parameters are set up, it is time to record your sample. For “manual” sampling, simply transmit a “Start Sampling” message. For “automatic” sampling, send an “Arm Trigger” message and then initiate the sampling process using the predetermined “trigger” method. It should be noted that if the sampling is initiated using the “Start Sampling” message, there might be some slight delay in the actual start due to the delay encountered when the MIDI System Exclusive command is transmitted. This is usually not a problem, since the DPM SX always provides a 512 word “pre-sample buffer.”

At this point, the sample resides in the DPM SX sample memory. It can now be transferred to the computer-based sample editor for editing.

- To transfer the sample from the DPM SX to the sample editor/player, simply set up the sample editor/player to receive the sample via the MIDI Sample Dump Standard, and request any sample number using the MIDI Sample Dump Request command. The sample will be sent using the number requested.

**Note:** The sample can also be transferred from the DPM SX by pressing the “MIDI DUMP” button on the front panel of the DPM SX.

## **4.2 Operation with sample editors using the Front Panel**

If your Sample Editor does not support the transmission of System Exclusive com-



mands or it is simply more convenient for you to use the front panel controls on the DPM SX, the following procedure should be used to get the most out of your sampling.

- Connect both MIDI cables to the DPM SX and to your computer, allowing MIDI information to be sent in both directions.

If you have a complex MIDI system setup, you might want to use a MIDI Data processor/patcher such as the Peavey MIDI Master to allow for the most flexible MIDI cabling. The Peavey MIDI Master will allow a number of MIDI instruments and controllers to be interconnected in different configurations without having to reconnect the cables each time a new MIDI configuration is needed.

- Connect the rest of your MIDI or keyboard system in the way that best suits your needs.
- Turn on each unit in your system in the previously described order.
- Connect your music or instrument “sound” source to the front panel of the DPM SX. Use the 1/4” phone jack for line level input signals or the XLR jack for any microphone level input signal (phantom powered or otherwise).
- Load and start up your favorite sample editing software package.
- Select the desired sample rate (depending on the desired sound fidelity or frequency response) by depressing the “SAMPLE RATE” button on the front panel. Using this button, the sample rate can be set to either 24 kHz or 48 kHz, providing bandwidths of either 10 kHz or 20 kHz, respectively.
- While playing the instrument or sound that is to be sampled, adjust the input level control until the clip/threshold LED flashes “red” only for an instant on the peaks of the signal. As you become more familiar with the DPM SX, you will determine what the optimal signal level is for your own specific needs.
- If the sampling is to be initiated by the input signal, depress the “ARM” button. The LED indicator above the “ARM” button will begin the flash, indicating that the sampler is “armed” and waiting on the input signal to trigger the sampling process. The default trigger level is 30 dB down from the clip level.
- If the sample is to be manually initiated from the front panel, it is not necessary to “arm” the sampler. It is only necessary to depress the “START/STOP” button at the beginning of the sample, and depress it a second time at the end of the sample. If the sample memory is filled before the “START/STOP” button is depressed the second time, the sample process will automatically stop.

**Note:** The sample length (in seconds) will be determined by the sample rate that has been selected and the total amount of memory that has been loaded into the unit. For example: At a sample rate of 48 kHz with 1 Megabyte of memory, the total sample time will be approximately 11 seconds.

At this point, the sample resides in the DPM SX sample memory. It can now be transferred to the sample player (DPM 3SE or DPM SP) for editing and playing, or to a computer-based sample editor for editing.

- To transfer the sample from the DPM SX to the sample editor/player, simply set up the sample editor/player to receive the sample via the MIDI Sample Dump Standard and depress the “MIDI DUMP” button on the front panel of the DPM SX.

**Note:** The Sample can also be requested from the DPM SX by requesting any sample number using a MIDI Sample Dump Request command. The sample will be sent using the number requested.

## Chapter 5 — About Sampling

A sample player can load samples in three main ways over MIDI:

**From Another Sampler.** This takes advantage of a part of the MIDI specification, the Sample Dump Standard (SDS), which specifies a universal way to exchange samples over the MIDI line between those instruments whose specifications conform to the SDS. Unfortunately, not all samplers are SDS-compatible and many use their own methods of data transfer. Furthermore, for best fidelity some sample players are 16-bit machines. Therefore, they require that samples be sent as 16-bit data. Check your sampler’s manual to see if it can transfer samples according to the SDS 16-bit standard. If not, you will not be able to transfer samples directly between the samplers.

**From Sample Editing Computer Programs.** These programs (such as *Sound Designer* and *Alchemy* for the Macintosh, *Avalon* and *Genwave* for the Atari, *Sample Wrench* for the Amiga, and *Sample Vision* for IBM machines) exist for virtually all popular computers; they can load samples into computer memory from a computer disk containing samples, a CD ROM disc containing samples, or another sampler. These samples can then be sent from the host computer to the sample player over the MIDI line.

As a bonus, sample editing programs usually provide a convenient work-around for samplers that don’t conform to SDS. These programs can transfer samples between the computer and those samplers supported by the program, regardless of whether or not they support SDS. The program should also be able to translate samples that use incompatible formats. Therefore, a non-SDS sample can be brought into the program, translated and sent out over MIDI as an SDS sample to the sample player, thus opening up a potentially huge library of samples.

**From the Peavey SX Sample Expander.** This device is (among other things) a digital audio recorder that can record a sound, digitize it, store it in a buffer memory, and then send the sample to the sample player.

**Note 1:** With SDS-compatible devices, there are two possible ways to load samples. The devices containing the sample to be transferred can send a sample to a second device set up to load samples, or the second device can request a particular sample (as identified by a number) from a sample-editing program or sampler capable of sending samples as SDS data. When transferring samples, loop and sample length parameters (as described later) in the source sample are retained in the second device.

**Note 2:** Different samples are often taken at different sample rates, with lower sampling rates trading off poorer fidelity for greater memory efficiency. In many sample transfer applications it is important to match sample rates, but the DPM 3SE performs an automatic sample rate conversion routine to ensure compatibility. This process does not alter the sample length, which will be the same in the DPM 3SE as in the source. Also, please note that sample rate conversion cannot improve the sound of a sample originally recorded with a low sample rate. The DPM 3SE will faithfully reproduce whatever you put into it: Put in a horrible sounding sample, and the DPM 3SE will play back a horrible sounding sample.

**Sample Transposition:** A sample is initially assigned to a single key on the keyboard. For example, if you record a plucked guitar string at middle C, this would be assigned to middle C on the keyboard (although you could assign it to another pitch if desired). The originally recorded pitch is called the *original pitch*. However, since each sample takes up a certain amount of memory, it is impractical to record one sound for each key. As a result, a single sample can be transposed over a range of notes.

Transposition can also be used as an effect. Remember the scene in *Raiders of the Lost Ark* where Indiana Jones is running away from a gigantic stone ball, rolling towards him with dizzying speed? The sound of that rolling ball was simply a microphone taping the rear wheel of a Honda car going down a gravel driveway. However, this source sound was slowed down and otherwise modified, thus producing the awesome sound you hear in the movie.

**Memory and Sample Time:** Samples (in fact, any digital audio signals) use up a lot of memory. One megabyte of sample memory allows for about 26 seconds worth of samples, but that sample time can be partitioned in several different ways: a single 26 second sample, two 13 second samples, a 20 second sample and six one second samples, and so on. It is also possible to save memory in other ways, such as trimming and looping, which are described later.

As an example, the DPM 3SE holds up to 32 sampled waves and 48 individual samples (some waves will probably be multi-sampled, hence the ability to load in more samples than there are waves).

**Multi-Sampling:** The further a note is transposed from its original pitch, the more unrealistic it sounds, especially with acoustic instrument samples. The problems are the

same as changing speeds on a tape recorder: Transposing up gives “munchkinization” (i.e., the sounds are thin and unnatural), whereas transposing down creates “Darth Vader” effects with muffled, deep sounds. These effects are not always undesirable—transposing a bass up far enough can create an entirely new type of sound—but for maximum realism, it’s best not to transpose a sound too far.

Because of this, most PCM Sample Players allow for multi-sampling, where several samples (perhaps at octave or fifth intervals) are used to cover the keyboard range. Thus, no note will have to be transposed over too wide a range, resulting in more realistic timbres.

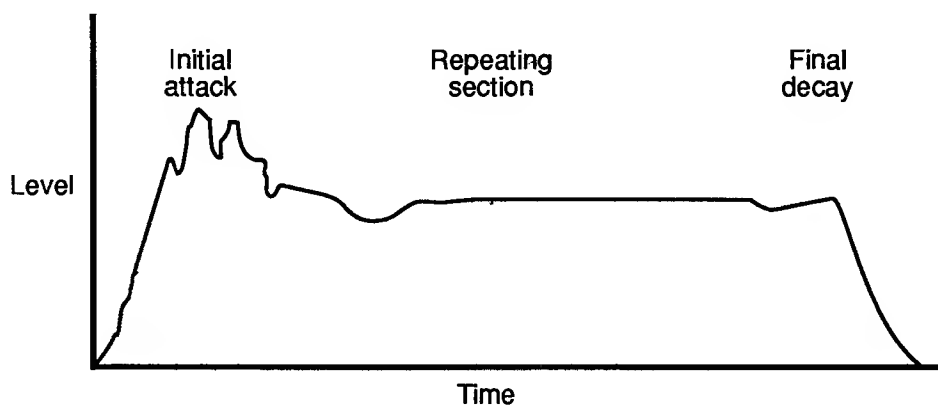
The tradeoff is that more samples use up more money. As a result, it’s usually best to concentrate on grouping the greatest number of samples towards the most-played range of the keyboard. For example, some bassy sounds can be transposed downwards up to an octave or so without sounding too unnatural. Likewise, for some sounds—like cello—you’re not going to play too much in the top octave. Therefore, one sample might suffice for, say, the top octave and a fifth.

For maximum user convenience, these multi-sampled waves are still saved as a single wave. For example, a multi-sampled guitar will show up as a single Guitar wave. (Of course, you can save each sample individually and assemble them in a Combi patch, but there is seldom any advantage to doing things this way.)

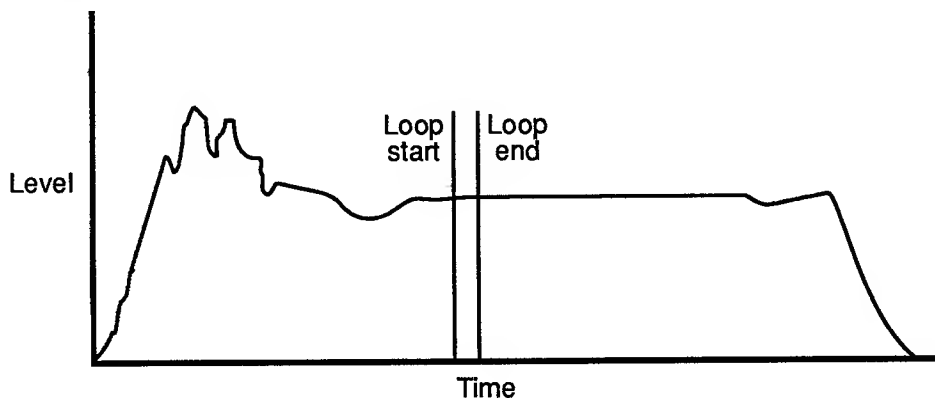
**About Sample Looping and Trimming:** Looping is an important way to save memory. It takes advantage of the fact that many acoustic sounds start with a complex initial transient, then settle down into a steady, repeating waveform. Consider a flute: It starts off with a burst of noise and a fairly complex sound, but then settles into a sustained tone.

Rather than play back this entire sustained tone, we can mark off a small part of the repeating waveform and play it over and over again through a process called *looping*.

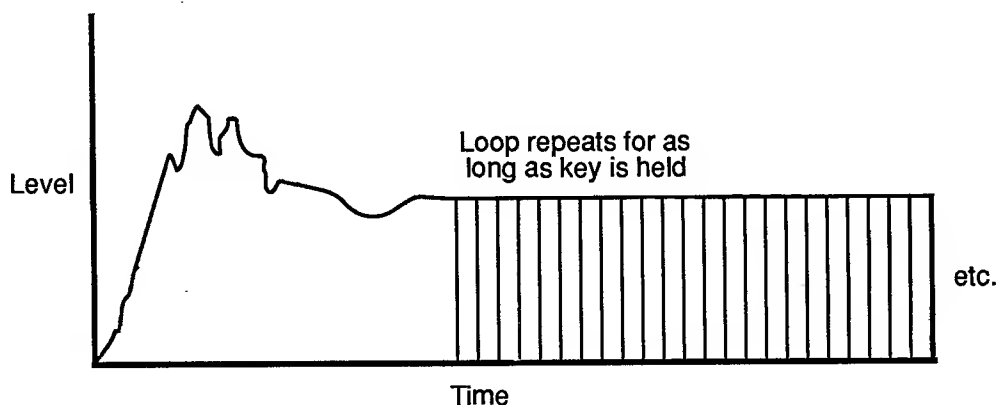
The following figure shows the amplitude envelope for a typical unlooped flute sound.



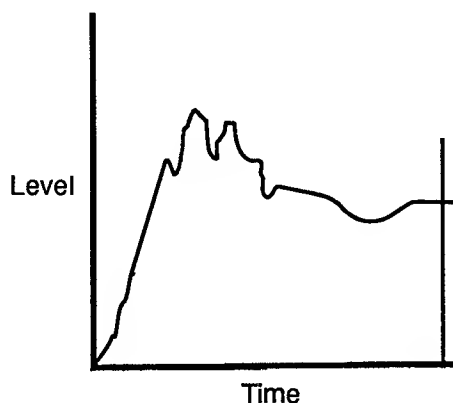
Note how there is a repeating section that occurs between the initial attack and final decay. This looks like a good place to create a loop; the following shows where we might put the loop.



When you press a key, the sample plays normally until it reaches the end of the loop. It then jumps back to the loop start point and plays the looped section again, jumps back to the beginnings, plays through the loop again, and keeps repeating the looped section for as long as the key is held down. Thus, a looped sound can sustain indefinitely.

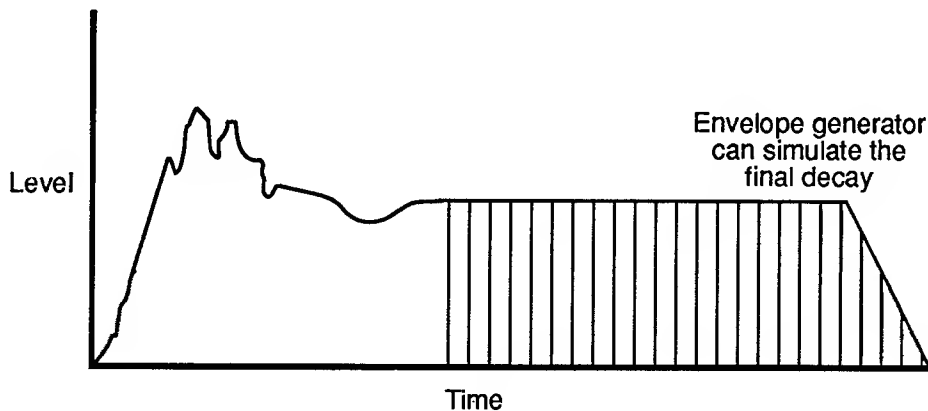


Since we no longer need the part of the sample that extends past the loop end, we can trim it off and reclaim a bunch of memory. Compare the figure below the original flute sample: The sample size has been cut in less than half, thus cutting memory requirements by more than half as well.



Trimming can trim the beginning of the sample, which is useful if some “dead space” got sampled before the attack kicked in. Trimming can also serve as an effect: Some sounds change character completely when you, for example, cut off the first few milliseconds of the initial attack.

We have one remaining task, which is to simulate the final decay of the original flute sound. This is easy to do by setting a short release time with an amplitude envelope generator. Upon releasing the key, the envelope generator will superimpose a decay on the looped signal.



## Chapter 6 — MIDI Implementation for the Peavey SX Sampling Expander

### Non System Exclusive Recognized Messages:

#### Note On

The DPM SX uses “note-on” commands to start sampling if it is armed and note-on commands are not being filtered.

#### Continuous Controller

The DPM SX uses continuous controllers only to trigger sampling when armed if they are not being filtered.

### Recognized System Exclusive Messages:

#### Identity Request

F0 7E <channel> 06 01 F7

The DPM SX will reply to an identity request in the standard MIDI format. An identity request will be acknowledged on channel 7F regardless of what channel the sampler is currently set.

### **Arm Trigger Message**

F0 00 00 1B 02 03 <channel> 01 F7

Upon receipt of this message, the DPM SX will be “armed” and will begin recording as soon as the input level reaches the threshold. This message has the same effect as pressing the “ARM” button on the sampler’s front panel.

### **Start Sampling Message**

F0 00 00 1B 02 03 <channel> 02 F7

Upon receipt of this message, sampling will begin immediately. This message has the same effect as pressing the “START/STOP” button on the sampler’s front panel.

### **Stop Sampling Message**

F0 00 00 1B 02 03 <channel> 03 F7

Upon receipt of this message, sampling will stop immediately. This message has the same effect as pressing the “START/STOP” button on the sampler’s front panel while sampling.

### **Channel Change Message**

F0 00 00 1B 02 03 <channel> 04 aa F7

aa                      Assigned Channel

Upon receiving this message, the DPM SX will set itself to transmit and receive on MIDI channel aa and will respond with a Sampler Configuration message. Note that if the channel number = 7F, that the DPM SX will respond regardless of what MIDI channel it is on. If aa is 7F, then the sampler will stay on its current channel but will still respond with a configuration message.

### **Set Pre Trigger Size**

F0 00 00 1B 02 03 <channel> 05 ss F7

ss                      Size of pre trigger buffer in 128 words intervals

This message will set the pre trigger size to ss where ss is the number of words in the pre trigger buffer size times 128 words.

### **Set Rate Message**

F0 00 00 1B 02 03 <channel> 06 pp pp pp F7

pp pp pp                      Sampling Period in nanoseconds (LSB first)

This command will set the sample rate based on the given parameter. Any sample period from 20833nS (48 kHz) to 83333nS (12 kHz) is valid. Invalid rates will be ignored.

### **Set Sample Size Message**

F0 00 00 1B 02 03 <channel> 07 ss ss ss ss F7

ss ss ss ss                      Maximum Sample Size (LSB first)

This command will set the sample rate based on the given parameter. If a sample size too large is requested, the size will be set to the size of the available RAM.

### **Set Dump Size Message**

F0 00 00 1B 02 03 <channel> 08 dd dd dd F7

dd dd dd                      Maximum Dump Size (LSB first)

This parameter can be set before or after a sample is taken. It allows large samples to be broken down into smaller segments, allowing them to be sent using SDS format. This command also allows the user to dump a small portion of a large sample for a quick check before sending the entire sample.

### **Set Trigger Filter Message**

F0 00 00 1B 02 03 <channel> 09 ff nn cc F7

ff                      trigger type. The four least significant bits determine how MIDI data will affect triggering.

0 - Trigger on this note

1—Trigger on all other notes

2—Trigger on this controller

3—Trigger on all other controllers

To trigger on all notes or all controllers, bits 0 and 1 or bits 2 and 3 should be set respectively.

nn                      MIDI note on trigger value

cc                      MIDI continuous controller trigger value

This command specifies how MIDI messages will affect the sampler while in the armed mode. Note-on and controller messages can be used to trigger sampling, if desired.

### **Trigger Threshold Message**

F0 00 00 1B 02 03 <channel> 0A tt F7

tt                      trigger threshold in negative dB's

Upon receipt of this message, the Peavey Sampler will set its trigger threshold to -tt dB below maximum level. Note that if a 0 dB threshold is specified, the sampler will never trigger based on the input signal level.



**Set Segment Number:**

F0 00 00 1B 02 03 <channel> 0B nn F7

nn                      Segment number

This message will cause the next dump to be started at this section of memory. The size of each segment is set using the Set Dump Size message.

**Set All Parameters Message**

F0 00 00 1B 02 03 <channel> 0C ww pp pp pp ss ss ss ss dd dd dd ff nn cc tt nn F7

ww                      Size of pre trigger buffer in 128 word intervals

pp pp pp              Sampling period in nanoseconds (LSB first)

ss ss ss ss            Maximum sample size (LSB first)

dd dd dd              Maximum Dump Size (LSB first)

ff                      Trigger type

nn                      MIDI note on trigger value

cc                      MIDI continuous controller trigger value

tt                      Trigger threshold in negative dB's

nn                      Segment number

This message will set all internal parameters. The format of each field is described in the appropriate preceding message.

**Transmitted System Exclusive Messages:****Sampler Configuration Message**

F0 00 00 1B 02 03 <channel> 41 ww pp pp pp ss ss ss ss dd dd dd ff mm cc tt nn F7

ww                      Pre trigger buffer size \*128 words

pp pp pp              Sampling period in nanoseconds (LSB first)

ss ss ss ss            Size (in words) of sample memory available (LSB first)

dd dd dd              Maximum dump size in words (LSB first)

ff	Trigger type
mm	MIDI note on trigger value
cc	MIDI continuous controller trigger value
tt	Trigger threshold in negative dB's
nn	Segment number

This message is sent by the Peavey Sampler after receipt of a channel change message. It reflects the state of all internal parameters. It will be transmitted on the channel assigned in the channel change message. The format of each field is the same as the format of the corresponding received message.

### **Clip Report Message**

F0 00 00 1B 02 03 <channel> 42 cc cc F7

cc	Number of samples which clipped (LSB first)
----	---

The Peavey Sampler will send this message indicating the number of clips after sampling has stopped.

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WARRANTY/REMEDY**

PEAVEY ELECTRONICS CORPORATION ("PEAVEY") warrants this product, EXCEPT for covers, footswitches, patchcords, tubes and meters, to be free from defects in material and workmanship for a period of one (1) year from date of purchase, PROVIDED, however, that this limited warranty is extended only to the original retail purchaser and is subject to the conditions, exclusions, and limitations hereinafter set forth:

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If this product contains tubes or meters, Peavey warrants the tubes or meters contained in the product to be free from defects in material and workmanship for a period of ninety (90) days from date of purchase; PROVIDED, however, that this limited warranty is extended only to the original retail purchaser and is also subject to the conditions, exclusions, and limitations hereinafter set forth.

**CONDITIONS, EXCLUSIONS, AND LIMITATIONS OF LIMITED WARRANTIES**

These limited warranties shall be void and of no effect, if:

- a. The first purchase of the product is for the purpose of resale; or
- b. The original retail purchase is not made from an AUTHORIZED PEAVEY DEALER; or
- c. The product has been damaged by accident or unreasonable use, neglect, improper service or maintenance, or other causes not arising out of defects in material or workmanship; or
- d. The serial number affixed to the product is altered, defaced, or removed.

In the event of a defect in material and/or workmanship covered by this limited warranty, Peavey will:

- a. In the case of tubes or meters, replace the defective component without charge.
- b. In other covered cases (i.e., cases involving anything other than covers, footswitches, patchcords, tubes or meters), repair the defect in material or workmanship or replace the product, at Peavey's option;  
and provided, however, that, in any case, all costs of shipping, if necessary, are paid by you, the purchaser.

THE WARRANTY REGISTRATION CARD SHOULD BE ACCURATELY COMPLETED AND MAILED TO AND RECEIVED BY PEAVEY WITHIN FOURTEEN (14) DAYS FROM THE DATE OF YOUR PURCHASE.

In order to obtain service under these warranties, you must:

- a. Bring the defective item to any PEAVEY AUTHORIZED DEALER or AUTHORIZED PEAVEY SERVICE CENTER and present therewith the ORIGINAL PROOF OF PURCHASE supplied to you by the AUTHORIZED PEAVEY DEALER in connection with your purchase from him of this product.  
If the DEALER or SERVICE CENTER is unable to provide the necessary warranty service you will be directed to the nearest other PEAVEY AUTHORIZED DEALER or AUTHORIZED PEAVEY SERVICE CENTER which can provide such service.

**OR**

- b. Ship the defective item, prepaid, to:

PEAVEY ELECTRONICS CORPORATION  
International Service Center  
Highway 80 East  
MERIDIAN, MS 39301

including therewith a complete, detailed description of the problem, together with a legible copy of the original PROOF OF PURCHASE and a complete return address. Upon Peavey's receipt of these items:

If the defect is remedial under these limited warranties and the other terms and conditions expressed herein have been complied with, Peavey will provide the necessary warranty service to repair or replace the product and will return it, FREIGHT COLLECT, to you, the purchaser.

Peavey's liability to the purchaser for damages from any cause whatsoever and regardless of the form of action, including negligence, is limited to the actual damages up to the greater of \$500.00 or an amount equal to the purchase price of the product that caused the damage or that is the subject of or is directly related to the cause of action. Such purchase price will be that in effect for the specific product when the cause of action arose. This limitation of liability will not apply to claims for personal injury or damage to real property or tangible personal property allegedly caused by Peavey's negligence. Peavey does not assume liability for personal injury or property damage arising out of or caused by a non-Peavey alteration or attachment, nor does Peavey assume any responsibility for damage to interconnected non-Peavey equipment that may result from the normal functioning and maintenance of the Peavey equipment.

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THESE LIMITED WARRANTIES ARE THE ONLY EXPRESSED WARRANTIES ON THIS PRODUCT, AND NO OTHER STATEMENT, REPRESENTATION, WARRANTY, OR AGREEMENT BY ANY PERSON SHALL BE VALID OR BINDING UPON PEAVEY.

In the event of any modification or disclaimer of expressed or implied warranties, or any limitation of remedies, contained herein conflicts with applicable law, then such modification, disclaimer or limitation, as the case may be, shall be deemed to be modified to the extent necessary to comply with such law.

Your remedies for breach of these warranties are limited to those remedies provided herein and Peavey Electronics Corporation gives this limited warranty only with respect to equipment purchased in the United States of America.

**INSTRUCTIONS — WARRANTY REGISTRATION CARD**

1. Mail the completed WARRANTY REGISTRATION CARD to:

PEAVEY ELECTRONICS CORPORATION  
POST OFFICE BOX 2898  
MERIDIAN, MISSISSIPPI 39302-2898

- a. Keep the PROOF OF PURCHASE. In the event warranty service is required during the warranty period, you will need this document. **There will be no identification card issued by Peavey Electronics Corporation.**
2. IMPORTANCE OF WARRANTY REGISTRATION CARDS AND NOTIFICATION OF CHANGES OF ADDRESSES:
  - a. Completion and mailing of WARRANTY REGISTRATION CARDS — Should notification become necessary for any condition that may require correction, the REGISTRATION CARD will help ensure that you are contacted and properly notified.
  - b. Notice of address changes — If you move from the address shown on the WARRANTY REGISTRATION CARD, you should notify Peavey of the change of address so as to facilitate your receipt of any bulletins or other forms of notification which may become necessary in connection with any condition that may require dissemination of information or correction.
3. You may contact Peavey directly by telephoning (601) 483-5365.

# DANGER

EXPOSURE TO EXTREMELY HIGH NOISE LEVELS MAY CAUSE A PERMANENT HEARING LOSS. INDIVIDUALS VARY CONSIDERABLY IN SUSCEPTIBILITY TO NOISE INDUCED HEARING LOSS. BUT NEARLY EVERYONE WILL LOSE SOME HEARING IF EXPOSED TO SUFFICIENTLY INTENSE NOISE FOR A SUFFICIENT TIME.

THE U.S. GOVERNMENT'S OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) HAS SPECIFIED THE FOLLOWING PERMISSIBLE NOISE LEVEL EXPOSURES:

## DURATION PER DAY IN HOURS

8  
6  
4  
3  
2  
1½  
1  
½  
¼ or less

## SOUND LEVEL dBA, SLOW RESPONSE

90  
92  
95  
97  
100  
102  
105  
110  
115

ACCORDING TO OSHA, ANY EXPOSURE IN EXCESS OF THE ABOVE PERMISSIBLE LIMITS COULD RESULT IN SOME HEARING LOSS.

EAR PLUGS OR PROTECTORS IN THE EAR CANALS OR OVER THE EARS MUST BE WORN WHEN OPERATING THIS AMPLIFICATION SYSTEM IN ORDER TO PREVENT A PERMANENT HEARING LOSS IF EXPOSURE IS IN EXCESS OF THE LIMITS AS SET FORTH ABOVE. TO INSURE AGAINST POTENTIALLY DANGEROUS EXPOSURE TO HIGH SOUND PRESSURE LEVELS, IT IS RECOMMENDED THAT ALL PERSONS EXPOSED TO EQUIPMENT CAPABLE OF PRODUCING HIGH SOUND PRESSURE LEVELS SUCH AS THIS AMPLIFICATION SYSTEM BE PROTECTED BY HEARING PROTECTORS WHILE THIS UNIT IS IN OPERATION.

# CAUTION

THIS MIXING CONSOLE/EFFECTS DEVICE/REAMP HAS BEEN DESIGNED AND CONSTRUCTED TO PROVIDE ADEQUATE SIGNAL (VOLTAGE) FOR PLAYING MODERN MUSIC. IMPROPER USE OF THE GAIN/EQUALIZER CONTROLS AND/OR IMPROPER USE OF INTERNAL/EXTERNAL BUSES MAY CREATE CLIPPING (SQUARE WAVES) AND POSSIBLY CAUSE SUBSEQUENT DAMAGE TO THE LOUDSPEAKER SYSTEMS. EXTENDED OPERATION OF THE GAIN/EQUALIZATION CONTROLS IN THEIR MAXIMUM POSITIONS IS THEREFORE NOT RECOMMENDED. PLEASE BE AWARE THAT MAXIMUM POWER CAN BE OBTAINED WITH VERY LOW SETTINGS OF THE GAIN/EQUALIZATION CONTROLS IF THE INPUT SIGNAL IS VERY STRONG.

IT IS COMMON PRACTICE AMONG USERS OF SOUND REINFORCEMENT EQUIPMENT TO IDENTIFY THE INDIVIDUAL CHANNELS WITH A STRIP OF TAPE PLACED ABOVE OR BELOW THE ROW OF VOLUME FADERS. MANY TYPES OR BRANDS OF TAPE HAVE A VERY STRONG ADHESIVE WHICH CAN INHIBIT THE PAINT ON THE FACEPLATE AND ACTUALLY REMOVE THE PAINT WHEN THE TAPE IS REMOVED. WE STRONGLY RECOMMEND THAT SCOTCH TAPE NOT BE USED ON PAINTED SURFACES NOR ANY OTHER TAPE THAT IS NOT ESPECIALLY DESIGNED FOR SUCH APPLICATIONS. MEDIUM OR LIGHT ADHESIVE MASKING OR LABEL TAPE IS RECOMMENDED IF TAPE IS USED. ANY TAPE LEFT ON PAINTED SURFACE FOR EXTENDED PERIODS WILL BE DIFFICULT TO REMOVE. NEVER USE CLEAR OR SCOTCH TAPE FOR THESE APPLICATIONS.

1. Read all safety and operating instructions before using this product.
2. All safety and operating instructions should be retained for future reference.
3. Obey all cautions in the operating instructions and on the back of the unit.
4. All operating instructions should be followed.
5. This product should not be used near water, i.e. a bathtub, sink, swimming pool, wet basement, etc.
6. This product should be located so that its position does not interfere with its proper ventilation. It should not be placed flat against a wall or placed in a built-in enclosure that will impede the flow of cooling air.
7. This product should not be placed near a source of heat such as a stove, radiator or another heat producing appliance.
8. Connect only to a power supply of the type marked on the unit adjacent to the power supply cord.
9. Never break off the ground pin on the power supply cord. For more information on grounding write for our free booklet "Shock Hazard and Grounding."
10. Power supply cords should always be handled carefully. Never walk or place equipment on power supply cords. Periodically check cords for cuts or signs of stress, especially at the plug and the point where the cord exits the unit.
11. The power supply cord should be unplugged when the unit is to be unused for long periods of time.
12. If this product is to be mounted in an equipment rack, rear support should be provided.
13. Metal parts can be cleaned with a damp rag. The vinyl covering used on some units can be cleaned with a damp rag, or an ammonia based household cleaner if necessary.
14. Care should be taken so that objects do not fall and liquids are not spilled into the unit through the ventilation holes or any other openings.
15. This unit should be checked by a qualified service technician if:
  - A. The power supply cord or plug has been damaged.
  - B. Anything has fallen or been spilled into the unit.
  - C. The unit does not operate correctly.
  - D. The unit has been dropped or the enclosure damaged.
16. The user should not attempt to service this equipment. All service work should be done by a qualified service technician.